(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 331 130 B1**

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **29.09.93**

(51) Int. Cl.[5]: **C07D 405/04**, C07D 403/04, C07D 401/04, C07D 409/04, C07D 403/12, C07D 403/14, C07D 223/16, A61K 31/55

(21) Application number: **89103531.3**

(22) Date of filing: **28.02.89**

The file contains technical information submitted after the application was filed and not included in this specification

(54) **Carbamic acid ester of substituted 7-hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepines.**

(30) Priority: **01.03.88 DK 1076/88**

(43) Date of publication of application:
06.09.89 Bulletin 89/36

(45) Publication of the grant of the patent:
29.09.93 Bulletin 93/39

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

(56) References cited:
EP-A- 0 005 299
EP-A- 0 200 455
EP-A- 0 285 919
US-A- 4 284 555

(73) Proprietor: **NOVO NORDISK A/S**
Novo Allé
DK-2880 Bagsvaerd(DK)

(72) Inventor: **Hansen, Kristian Tage**
Soburghusparken 16
DK-2860 Soburg(DK)
Inventor: **Bundgaard, Hans**
Tjornevej 36
DK-2970 Horsholm(DK)
Inventor: **Faarup, Peter**
Skraplanet 15
DK-3500 Vaerlose(DK)

(74) Representative: **Patentanwälte Grünecker, Kinkeldey, Stockmair & Partner**
Maximilianstrasse 58
D-80538 München (DE)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

EP 0 331 130 B1

Description

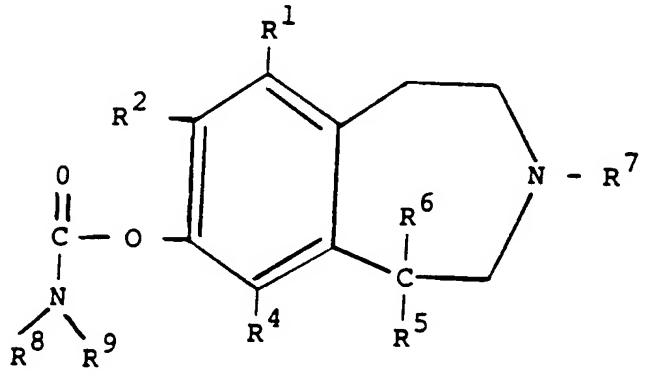
This invention relates to novel carbamic acid esters of substituted 7-hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepines which are useful prodrugs for treatment of mental disorders. As used in this specification the term "prodrug" is defined as a derivative of a biologically active compound, which derivative, when absorbed into the blood stream of animals and humans, decomposes in such manner as to release the active substance and permits the latter to attain a higher bioavailability than that which would be obtained if the active substance, per se, was administered perorally. Thus, the active substance can be administered without problems intravenously; however, peroral administration is usually preferred for obvious reasons. Peroral administration of the active substance is often unsatisfactory, as it is decomposed in the gastrointestinal tract and during the first pass through the liver; but peroral administration of the prodrug has both the advantage of an easy administration and a high bioavailability.

EP-A- 86303001 describes 2,3,4,5-tetrahydro-1H-3-benzazepines useful in the treatment of mental disorders. If administered intravenously, these benzazepines are very useful in the treatment of mental disorders, as described in the European patent application; however, if administered orally they suffer from the disadvantage that very large doses have to be given in order to obtain the wanted effect.

Thus, a need exists for a measure, by means of which the benzazepines described in EP-A-86303001 can be administered orally in much smaller doses and yet generate the wanted effect.

Now, according to the invention it has been found that a selected category of the benzazepines described in EP-A- 86303001, i.e. the category carrying a (phenolic) hydroxy group at the position No. 7 in the benzazepine nucleus (corresponding to the case of R^3 being hydroxy in the terminology of the European patent application) can be converted to useful prodrugs, if certain selected carbamic acid esters are formed of the members belonging to this selected category of benzazepines.

Thus, the carbamic acid esters of susbtituted 7-hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepines according to the invention have the general formula I



(I)

wherein R^1 is H, halogen, or C_{1-4} alkyl

R^2 is halogen, CF_3, CN

R^4 is H, or halogen

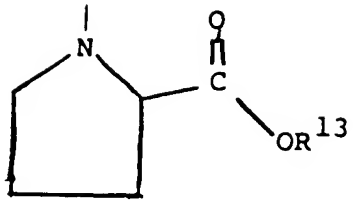
R^5 is furyl, thienyl, pyridyl, or ring systems consisting of phenyl ortho condensed with a benzene, cyclohexane, cyclohexene, cyclopentane or cyclopentene ring in which rings one of the carbon atoms may be exchanged with oxygen, sulphur or nitrogen, and each of these ring systems optionally are substituted with halogen, hydroxy or alkoxy with not more than 4 carbon atoms,

R^6 is H or CH_3

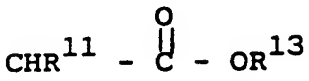
R^7 is H or C_{1-4} alkyl

R^8 is H or alkyl

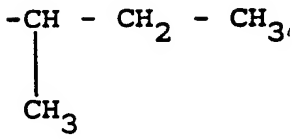
R^9 is H, or R^9 together with R^8 forms a piperidino, pyrrolidinyl, morpholino, or piperazinyl ring or



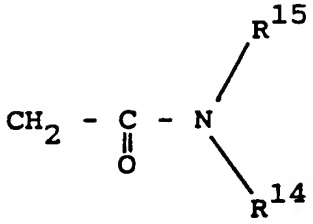
or R^9 can be alkyl or a group with the formula



where R^{11} is H, CH_3, $(CH_3)_2CH$,



or $-CH_2 - CH_2 - S - CH_3$,
and R^{13} is H, alkyl or a 2-acetamide group with the formula



where R^{15} is H, CH_3, C_2H_5, C_3H_8, or $CH(CH_3)_2$, and
R^{14} is H, CH_3, C_2H_5, C_3H_8 or $CH(CH_3)_2$,
and pharmaceutical-acceptable salts thereof.

In a preferred embodiment of the esters according to the invention R^1 represents hydrogen. Such esters are easily synthesized.

In a preferred embodiment of the esters according to the invention R^2 is halogen, preferably chloro or fluoro. The corresponding parent substance exhibits a very high affinity to the receptor.

In a preferred embodiment of the esters according to the invention R^4 is hydrogen. Such esters are easily synthesized.

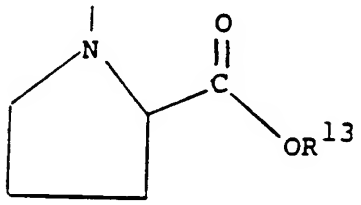
In preferred embodiments of the esters according to the invention R^5 is phenyl ortho condensed with a benzene, cyclohexane, cyclohexene, cyclopentane or cyclopentene ring which may be substituted with halogen, hydroxy or methoxy;
benzofuranyl or 2,3-dihydrobenzo-furanyl;
benzothienyl or 2,3-dihydrobenzothienyl;
furyl, thienyl or pyridyl;
chromanyl or chromenyl;
indolyl or indolinyl;
or quinolinyl. Due to the big and lipophile R^5 moieties the pharmacological effect is very potent.

In a preferred embodiment of the esters according to the invention R^6 represents hydrogen. Such esters are easily synthesized.

In a preferred embodiment of the esters according to the invention R^7 is hydrogen, methyl, or cyclopropyl. Such esters exhibit a potent pharmacological effect.

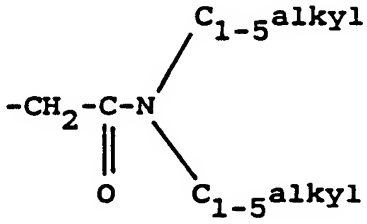
In a preferred embodiment of the esters according to the invention R^8 is alkyl and R^9 is H or alkyl.

In a preferred embodiment of the esters according to the invention R^8 and R^9 together form a ring with the formula



;

where R^{13} is alkyl, preferably C_1-C_5-alkyl, or an N,N-di (C_{1-5}-alkyl)2-acetamide group



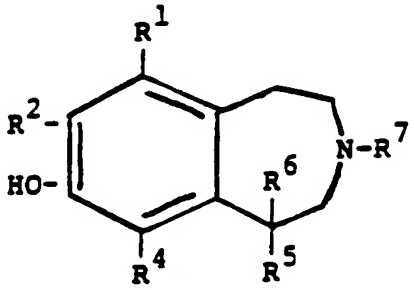
Further compounds in accordance with the present invention are:
(+)-8-chloro-7-(allylamino-carbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine and (+)-8-chloro-7-[(N-methyl-N-ethoxycarbonyl)aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

The invention also comprises a pharmaceutical composition comprising a compound according to the invention or a salt thereof together with a pharmaceutically acceptable carrier or diluent. In solid form the pharmaceutical composition is suitable for oral administration. The pharmaceutical composition is usually prepared as a tablet or a capsule, preferably as an enteric coated tablet.

The composition according to the invention can be used as a neurolepticum.

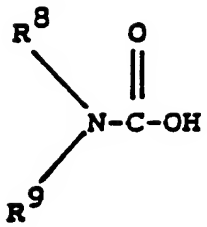
Preferably it is used for the treatment of schizophrenia, other psychoses and manio-depressive disorders.

The present invention provides a process for preparing esters of general formula I or salts thereof characterized by reacting a benzazepine compound of the general formula II



(II)

wherein R^1,R^2,R^4,R^5,R^6 and R^7 are defined as above,
with an activated carbamic acid (III) of the formula



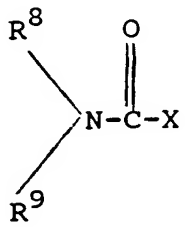
(III)

wherein R^8 and R^9 are defined as above, or with one or two isocyanates V

R^8-N = C = O and/or R^9-N = C = O (V)

wherein R^8 and R^9 are defined as above,
whereafter (I) is isolated and if wanted converted to a salt.

The activated carbamic acid is preferably



(IV)

wherein X is a halogen, preferably chloride.

As appears from the above, several active centers can be present in the carbamic acid esters according to the invention. It is to be understood that the invention comprises both racemates and all optical isomers.

The new compounds may be synthesized by esterification of the 7-hydroxy-benzazepine with an active carbamic acid derivative. In order to synthesize the new compounds also various new intermediates have been synthesized according to methods published in the literature. Thus, carbamoyl chlorides of N-substituted amino pro-moieties are prepared by reacting the actual N-substituted amino compound in its base form with phosgene in a suitable organic solvent (vide e.g. J.Org.Chem., 51, 1986, 3494-3498), and isocyanates of unsubstituted amino pro-moieties are generally prepared by reacting the amino compound in its base form with the diphosgene reagent trichloromethyl chloroformate (TCF, e.g. J.Org.Chem. 41, 1976, 2070-71; Org.Synth., 59, 1979, 195-201). The identity of these pro-moiety intermediates are confirmed by micro-analysis, IR, and ^{1}H NMR spectroscopy.

In EP-A- 170 090 it is stated in the paragraph bridging pages 4 and 5 that there is no way to accurately predict which prodrug structure will be suitable for a particular drug, and that a derivative which will work well for one drug may not do so for another, as differences in absorption, metabolism, distribution, and excretion among drugs do not permit generalizations to be made about prodrug design. Also, from page 34 in this EP-A- 170 090 it appears that different (but related) parent substances with the same prodrug moiety exhibit widely varying relative bioavailabilities, which confirms the above finding that there is no way to accurately predict which prodrug structure will be suitable for a particular drug, even if a similar drug is known to exhibit a satisfactory relative bioavailability with a specific prodrug structure.

Thus, even if it appears from US-A- 4,284,555 that a certain class of benzazepines can be esterified with carbamic acid esters to form prodrugs with improved relative bioavailability, the parent substances in this invention (the previously described subgroup of the benzazepines described in EP-A- 86303001) differ significantly from the benzazepines described in US patent No. 4,284,555, and thus there would be no accurate way to predict which kind of prodrug structure would be suitable for the parent substances in the invention.

The prodrug effect is measured as the ratio between the area under the curve representing the concentration of the parent substance in the blood stream versus time in case of oral administration of the prodrug and the corresponding area in case of intravenous administration of an equimolar amount of the corresponding parent compound. In the sense of this invention the parent compound corresponding to a

certain prodrug is a compound related to the prodrug, the only difference being that the position No. 7 in the parent compound carries the unesterified phenolic hydroxy group only. It has been found that mainly the parent compound is found in the blood stream if the prodrug is administered orally.

For more detailed information in regard to prodrug definition reference can be made to A.A. Sinkula and S.H. Yalkowsky; J.Pharm.Sci., 64, 1975, 183-210, H. Bundgaard (ed.) (1985), Design of Prodrugs, Elsevier, Amsterdam, E.B. Roche (ed.) 1977, Design of Biopharmaceutical Properties through Prodrugs and Analogs, American Pharmaceutical Association, Washington D.C.

More precisely, the prodrug effect of the bioavailability is measured in the following manner.

The prodrug is administered perorally to a test animal and in a total dose designated "$dose_{p.o.}$". The concentration of the parent substance in the blood in mg of parent substance/ml of plasma is measured at regular time intervals after administration, and a curve representing this concentration versus time, e.g. in hours, is drawn up. The area under the curve ($AUC_{p.o.}$) in (mg/ml) x minutes is calculated.

Similarly the parent substance is administered intravenously in a total dosis designated "$dose_{i.v.}$". A similar curve is drawn up, and the area below this curve is similarly "$AUC_{i.v.}$".

The bioavailability F is calculated according to the formula

$$F = \frac{AUC_{p.o.}/dose_{p.o.}}{AUC_{i.v.}/dose_{i.v.}} \cdot 100\%$$

More specifically, in relation to this invention the bioavailability of the prodrugs is measured in dogs.

In a cross-over study parent substance and corresponding prodrug are administered with an interval of one week, the parent substance as an intravenous bolus and the corresponding prodrug as an oral solution, respectively.

By means of solid phase extraction of the plasma samples and HPLC the plasma concentration of both parent substance and prodrug is estimated up to 24 hours after administration.

After the examples illustrating the synthesis of the prodrugs findings in regard to the bioavailability of some of the exemplified prodrugs and some prodrugs chemically related thereto will be presented.

The invention will be further illustrated by the following examples.

EXAMPLE 1

(+)-8-chloro-7[(N,N-dimethylamino)carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

1.0 g (3.04 mmol) of the parent substance ((+)-8-chloro-7-hydroxy-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine) was dissolved in 20 ml of dry pyridine. To this solution was added in a single operation 0.56 ml (6.08 mmol) of N,N-dimethyl carbamoyl chloride. The thus obtained mixture was placed on an oil bath and refluxed for 24 hours. Pyridine was evaporated in vacuo together with excess of reagent. The residual material was dissolved in 30.0 ml of dry ether and precipitated with a 1.0 N HCl solution in ether. The white precipitate was washed with 2 x 10 ml of dry ether. Drying in the presence of P_2O_5 was performed for 24 hours at 0.2 mm Hg.

The purity of the product in this example and in Examples 2-6 was determined by means of a HPLC method, see below.

The synthesized compound was chromatographed on a Nucleosil RP C-18 silica support (mean particle size 5 µm) column by means of a step gradient procedure. The eluent program was initiated with a mixture of 25% of acetonitrile and 75% of a 0.1M ammonium sulphate buffer of pH 3.0. By means of two steps the acetonitrile volume fraction of the eluent was raised to 55%. Detection of the column outflow was performed by means of UV absorbance.

Purity according to HPLC > 98%. The product peak corresponds to a retention time of 16.0 minutes.

^{1}H-NMR,δppm. ($CDCl_3$, TMS): 2.36 3H(s); 3.00 6H(s); 2.70-3.30 6H(m); 4.60 1H(t); 6.10 1H(s); 6.70-7.55 6H(m);

EXAMPLE 2

(+)-8-chloro-7-[(N,N-diethylamino)carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

0.5 g (1.52 mmol) of ((+)-8-chloro-7-hydroxy-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine) was dissolved in 20 ml dry pyridine. To this solution was added in one operation 0.39 ml (3.04 mmol) N,N-diethyl carbamoyl chloride. The thus obtained mixture was placed on an oil bath and refluxed for 24 hours. Pyridine was evaporated in vacuo together with excess of reagent. The residual material was dissolved in 20 ml of dry ether and precipitated with a 10% excess of 1N HCl solution in ether. The white precipitate was washed with 2x10 ml of dry ether. Drying with P_2O_5 was performed for 24 hours at 0.2 mm Hg.

Purity according to HPLC > 98%. The product peak corresponds to a retention time of 24.0 minutes.

^{1}H-NMR,δppm. ($CDCl_3$, TMS): 1.15 6H(m); 2.84 3H(s): 2.9-4.2 6H(m); 3.30 4H(m); 5.48 1H(s); 6.30 1H(s); 6.84-7.70 6H(m); 2.9-4.2 6H(m).

EXAMPLE 3

(+)-8-chloro-7-[(N-methyl-N-ethoxycarbonyl)amino carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

0.98 g (3.0 mmol) of (+)-8-chloro-7-hydroxy-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine was dissolved in 10 ml dry pyridine. This solution was added dropwise and at room temperature to a solution of 1.5 g (9 mmol) of N- methyl-N-chloroformyl ethyl carbamate in 5 ml of dry pyridine. The thus obtained mixture was placed on an oil bath and refluxed for 16 hours. Pyridine was evaporated in vacuo together with excess of reagent. The recidual material was dissolved in 20 ml of dry ether and precipitated with 10% excess of 1N HCl dissolved in ether. The white precipitate was washed twice with 10 ml of dry ether.

Purity according to HPLC > 98%. The product peak corresponds to a retention time of 15.8 minutes.

^{1}H-NMR,δppm. ($CDCl_3$, TMS): 1.30 3H(t); 2.96 3H(s); 3.28 3H(s); 4.25 2H(q); 2.9-4.2 6H(m); 5.50 1H(s); 6.30 1H(s); 6.85-7.70 6H(m).

EXAMPLE 4

(+)-8-chloro-7-[(R,S)-N-(1-methoxycarbonyl-1-ethyl)amino carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

0.40 g (3.05 mmol) of N-carbonyl D,L alanine methyl ester is dissolved in 5 ml acetonitrile. This solution was added dropwise to a refluxing solution of 0.50 g (1.52 mmol) of (+)-8-chloro-7-hydroxy-5-(7-benzofuranyl-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine in 20 ml of acetonitrile, and reflux is continued for further 8 hours. Acetonitrile and excess of reagent was evaporated in vacuo, leaving a yellow oil, which was easily purified by flash chromatography on a silica column and evaporated in vacuo to a white crystalline compound.

Purity according to HPLC > 98%. The product peak corresponds to a retention time of 14.3 minutes.

^{1}H-NMR,δppm. (CD_3-SO-CD_3, TMS): 1.25 3H(8d); 2.28 3H(s); 2.80-4.20 8H(m); 3.56 3H(s); 4.80 1H(d); 6.30 1H(s); 7.0-8.0 6H(m).

EXAMPLE 5

(+)-8-chloro-7-[(S)(2-methoxycarbonyl)-1-pyrrolidinyl-carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

A solution of 0.58 g (3.05 mmol) of N-chlorocarbonyl L-proline methyl ester in 10 ml of dry pyridine was dropwise added to 0.5 g (1.52 mmol) of (+)-8-chloro-7-hydroxy-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine in 10 ml of dry pyridine. When the addition was complete, the mixture was placed on an oil bath for 16 hours with reflux. Pyridine and excess of reagent was evaporated in vacuo, and the residual material was taken into 50 ml of ether, and washed with 5% $NaHCO_3$, saturated NaCl and H_2O. The ether phase was dried over $MgSO_4$ and evaporated to an oil. The residual oil was purified on a silica

column by means of flash chromatography, and after vacuum evaporation of the eluent a white crystalline compound was obtained.

Purity according to HPLC > 98%. The product peak corresponds to a retention time of 18.5 minutes.

^{1}H-NMR, ppm. ($CDCl_3$, TMS): 1.50-4.50 19H(m,complex); 4.80 1H(d); 6.40 1H(d); 6.80-7.70 6H(m).

EXAMPLE 6

(+)-8-chloro-7-(isopropylamino carbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

To a refluxing mixture of 0.5 g(1.52 mmol) of (+)-8-chloro-7-hydroxy-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin in 20 ml acetonitrile was dropwise added 0.30 ml (3.04 mmol) isopropyl isocyanate. The mixture was refluxed for additional 6 hours, and then the acetonitrile was removed by evaporation in vacuo. The residual material was obtained as analytically pure crystals from hot isopropanol.

Purity according to HPLC > 98%. The product peak corresponds to a retention time of 17.5 minutes.

^{1}H-NMR, δ ppm. (CD_3SOCD_3, TMS): 1.00 6H(d); 2.20 3H(s); 2.10-3.50 8H(m); 4.80 1H(s); 6.25 1H(s); 6.8-7.9 6H(m).

In analogy with the preparation described in example 6 the following compounds were synthesized:

EXAMPLE 7

(+)-8-chloro-7-(allylamino carbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

^{1}H-NMR, δ ppm. ($CDCl_3$, TMS): 2.35, 3H(s); 2.4-3.3 6H(m); 3.8 2H(t); 4.8 1H(t); 5.0-5.2 3H(m); 5.8 1H-(m); 6.4 1H(s); 6.78 1H(s); 7.05 1H(d); 7.25 2H(m); 7.55 2H(m).

EXAMPLE 8

(+)-8-chloro-7-(n-butylamino carbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

by heating to 70 °C in toluene with 0.2 equiv. of N-methylpiperidine as catalyst.

^{1}H-NMR, δ ppm. ($CDCl_3$, TMS): 1.2 7H(m); 2.3 3H(s); 2.4-3.3 6H(m); 4.7 1H(d); 5.0-5.2 3H(m); 6.4 1H(s); 6.8 1H(d); 7.05 1H(d); 7.25 2H(m); 7.6 2H(m).

EXAMPLE 9

(+)-8-chloro-7-[(S)-N-(1-methoxycarbonyl-2-methyl-butyl)amino carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

^{1}H-NMR, δ ppm. ($CDCl_3$, TMS): 1.2-1.5 9H(m); 2.3 3H(s); 2.4-3.2 6H(m); 3.8-4.3 4H(s,m); 4.55 1H(d); 5.2 2H(m); 6.3 1H(s); 6.7 2H(m); 7.3 2H(m); 7.6 2H(m).

In analogy with the preparation described in example 2 the following compounds were synthesized:

EXAMPLE 10

(+)-8-chloro-7-[(N,N-dimethylamino)carbonyloxy]-5-(2,3-dihydrobenzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl

^{1}H-NMR, δ ppm. free base (CD_3SOCD_3, TMS): 2.2 1H(t); 2.3 3H(s); 2.85 3H(s); 3.0 3H(s); 2.6-3.3 7H(m); 4.35 1H(d); 4.4 2H(t); 6.38 1H(s); 6.95 2H(m); 7.2 2H(m).

EXAMPLE 11

(+)-8-chloro-7-[(N,N-diethylamino)carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl

^{1}H-NMR, δ ppm. (CD_3SOCD_3, TMS): 1.15 6H(double t); 2.85 3H(s); 3.0-3.8 12H(m); 4.5 2H(m); 4.85 1H-(d); 6.3 1H(s); 7.0 2H(m); 7.3 2H(d);

EXAMPLE 12

(+)-8-chloro-7-[(N-methyl-N-ethyl)amino carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl

by refluxing 8 h in pyridine.

^{1}H-NMR, δ ppm. free base (CD_3SOCD_3, TMS): 1.0-1.15 3H(double t, after heating to 90 °C it appears as one t); 2.15 1H(t); 2.25 3H(s); 2.7-3.4 12H(m); 4.4 1H(d); 4.45 2H(t); 6.35 1H(broad s); 6.9 2H(m); 7.2 2H(d).

EXAMPLE 13

(+)-8-chloro-7-[(N-methyl-N-isopropyl)amino carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl

by refluxing 8 h in pyridine.

^{1}H-NMR, δ ppm. free base (CD_3SOCD_3, TMS): 1.0-1.2 6H(double d); 2.15 1H(t); 2.25 3H(s); 2.7-3.25 11H(m); 4.4 1H(d); 4.45 2H(t); 6.3 1H(s); 6.9 2H(m); 7.2 1H(d); 7.4 1H(s).

EXAMPLE 14

(+)-8-chloro-7-[(S)-(2-N,N-diethylaminocarbonyl-methyloxycarbonyl)-1-pyrrolidinyl-carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

by refluxing 4 h in pyridine.

^{1}H-NMR, δ ppm. (CD3$SOCD_3$, D_2O, TMS): 1.0-1.1 6H(double t, after heating to 90 °C it appears as one t); 1.9 2H(m); 2.1-2.3 6H(s,m); 2.6-3.6 13H(m); 4.3-4.55 4H(m); 4.6-4.85 2H(m); 6.35 1H(d); 6.9 2H(m); 7.2 2H(m); 7.4 1H(d).

EXAMPLE 15

(+)-8-chloro-7-[(R)-(2-N,N-diethylaminocarbonyl-methyloxycarbonyl)-1-pyrrolidinyl-carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

by refluxing 4 h in pyridine.

^{1}H-NMR, δ ppm. (CD_3SOCD_3, D_2O, TMS). 1.0-1.1 6H(double t, after heating to 90 °C it appears as one t); 1.9 2H(m); 2.1-2.3 6H(s,m); 2.6-3.6 13H(m); 4.3-4.55 4H(m); 4.6-4.85 2H(m); 6.35 1H(d); 6.9 2H(m); 7.2 2H(m); 7.4 1H(d).

EXAMPLE 16

(+)-8-chloro-7-[(S)-(2-carboxy)-1-pyrrolidinyl-carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

113 mg (0.2 mmol) of (+)-8-chloro-7-[(S)-(2-benzyloxycarbonyl)-1-pyrrolidinyl-carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine (example 22) were dissolved in 20 ml tetrahydrofuran. 10 mg palladium/cellite (10%) was added and the suspension was hydrogenated at room temperature and 1 atm. for 45 min. Further 20 mg of palladium/carbon (10%) was added, and the mixture was hydrogenated for 3 h. The catalyst was removed by filtration, and the solvent was evaporated in vacuo. The residual material was dissolved in a few ml of methanol/tetrahydrofuran, water was added and the product was obtained by lyophilyzation.

^{1}H-NMR, ppm. (CD_3SOCD_3, D_2O, TMS): 1.8-2.0 3H(m); 2.1-2.3 1H(m); 2.25 3H(s); 2.9-4.6 22H(m); 6.45 1H(s); 6.9 2H(d); 7.2 1H(broad s); 7.4 1H(d).

EXAMPLE 17

(+)-8-chloro-7-[(R)-(2-carboxy)-1-pyrrolidinyl-carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

The compound was prepared in analogy with the preparation described in example 24.
^{1}H-NMR, δ ppm. (CD_3SOCD_3, H_2O, TMS): 1.8-2.0 3H(m); 2.1-2.3 1H(m); 2.25 3H(s); 2.9-4.6 22H(m); 6.45 1H(s); 6.9 2H(d); 7.2 1H(broad s); 7.4 1H(d).
In analogy with the preparation described in example 5 the following compounds were synthesized:

EXAMPLE 18

(+)-8-chloro-7-[(S)-N-methyl-N-(1-methoxycarbonyl-1-ethyl)amino carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

by refluxing 6 h in pyridine.
^{1}H-NMR, δ ppm. (CD_3SOCD_3, TMS): 1.4 3H(double d); 2.2 1H(t); 2.25 3H(s); 2.7-3.3 10H(m); 3.6 3H-(double s); 4.4 1H(d); 4.5 2H(t); 4.6 1H(m); 6.4 1H(d); 6.9 2H(m); 7.2 1H(d); 7.4 1H(d).

EXAMPLE 19

(+)-8-chloro-7-[N-methyl-N-(methoxycarbonyl-methyl)amino carbonyloxy]-5-(2,3-dihydrobenzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

^{1}H-NMR, δ ppm. (CD_3SOCD_3, TMS): 2.2 1H(t); 2.3 3H(s); 2.8-3.3 10H(m); 3.65 3H(d); 4.15 2H(d); 4.4 1H(t); 4.5 2H(t); 6.4 1H(d); 6.9 2H(m); 7.2 1H(d); 7.4 1H(d).

EXAMPLE 20

(+)-8-chloro-7-[(R,S)-N-methyl-N-(1-methoxycarbonyl-1-ethyl)amino carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine

by refluxing 6 h in pyrididne.
^{1}H-NMR, δ ppm. (CD_3SOCD_3, TMS): 1.4 3H(double d); 2.2 1H(t); 2.3 3H(s); 2.8-3.4 10H(m); 3.6 3H(t); 4.4 1H(d); 4.5 2H(t); 4.6 1H(m); 6.4 1H(d); 6.9 2H(m); 7.2 1H(d); 7.4 1H(d).

EXAMPLE 21

(+)-8-chloro-7-[(N-methyl-N-carboxymethyl)amino carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl

The compound was prepared in analogy with the preparation described in example 26 by hydrogenation for 10 h using the hydrochloride salt of (+)-8-chloro-7-[N-methyl-N-(benzyloxycarbonyl-methyl)amino carbonyloxy]-5-(2,3-dihydro-benzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine
^{1}H-NMR, δ ppm. (CD_3SOCD_3, TMS): 2.75 3H(s); 2.8-3.0 3H(2s); 3.1-3.6 8H(m); 3.9-4.1 2H(2s); 4.5 2H(m); 4.8 1H(s); 6.35 1H(s); 6.9 2H(d); 7.3 1H(d); 7.5 1H(d).

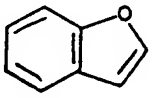
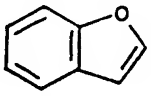
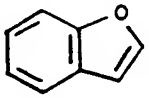
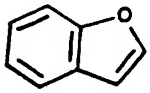
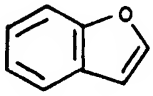
EXAMPLE 22

Tablets are prepared by methods known to professionals skilled in the art, the composition of each tablet being:

Formulation, tablets	mg/tablet
Benzazepine	50
Lactose	120
Avicel (PH 101)	40
Kollidon K25	5
Talcum	4
Magnesium stearate	1
Tablet weight	220

The bioavailability of the prodrugs described in Examples 1-22, measured in mongrel dogs in accordance with the previously indicated method, are presented in the below indicated table.

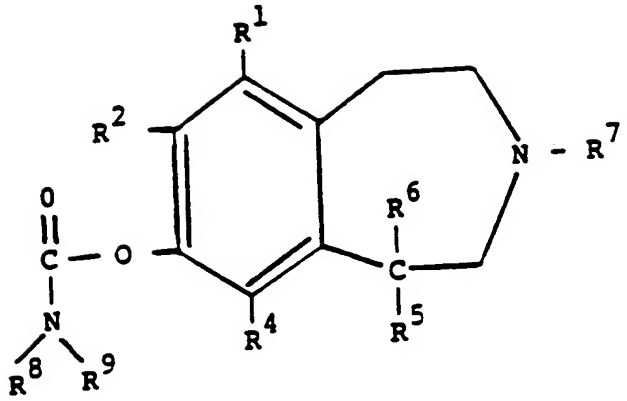
TABLE

Example No.	Absolute bioavailability, F (%)			
	R^5	R^8	R^9	F (%)
Example 1		$-CH_3$	$-CH_3$	20
Example 4		-H	$-CH(CH_3)-C(=O)-OCH_3$	40
Example 6		-H	$-CH(CH_3)_2$	15
Example 7		-H	$-CH_2-CH=CH_2$	24
Example 9		-H	$-CH(C(=O)-OCH_3)-CH(CH_3)-CH_2-CH_3$	11

Claims

Claims for the following Contracting States : AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE

1. Carbamic acid esters of substituted 7-hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepines with the general formula I



(I)

wherein R^1 is H, halogen, or C_{1-4} alkyl

R^2 is halogen, CF_3, CN

R^4 is H, or halogen

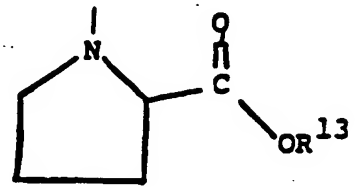
R^5 is furyl, thienyl, pyridyl, or ring systems consisting of phenyl ortho condensed with a benzene, cyclohexane, cyclohexene, cyclopentane or cyclopentene ring in which rings one of the carbon atoms may be exchanged with oxygen, sulphur or nitrogen, and each of these ring systems optionally are substituted with halogen, hydroxy or alkoxy with not more than 4 carbon atoms,

R^6 is H or CH_3

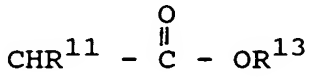
R^7 is H or C_{1-4} alkyl

R^8 is H or alkyl

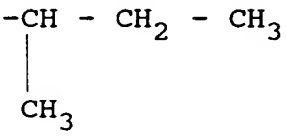
R^9 is H, or R^9 together with R^8 forms a piperidino, pyrrolidinyl, morpholino, or piperazinyl ring or



or R^9 can be alkyl or a group with the formula

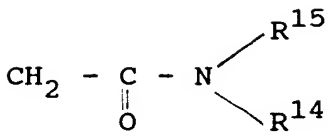


where R^{11} is H, CH_3, $(CH_3)_2CH$,



or - CH_2 - CH_2 - S - CH_3,

and R^{13} is H, alkyl or a 2-acetamide group with the formula



where R^{15} is H, CH_3, C_2H_5, C_3H_8, or $CH(CH_3)_2$, and
R^{14} is H, CH_3, C_2H_5, C_3H_8 or $CH(CH_3)_2$,
and pharmaceutical-acceptable salts thereof.

2. A compound according to claim 1, which is (+)-8-chloro-7[(N,N-dimethylamino)carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

3. A compound according to claim 1, which is (+)-8-chloro-7-[(R,S)-N-(1-methoxycarbonyl-1-ethyl)amino carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

4. A compound according to claim 1, which is (+)-8-chloro-7-[(S)-N-(1-methoxycarbonyl-2-methyl-butyl)-aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

5. A compound according to claim 1, which is (+)-8-chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

6. A compound according to claim 1, which is (+)-8-chloro-7-[(N,N-dimethylamino)carbonyloxy]-5-(2,3-dihydrobenzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

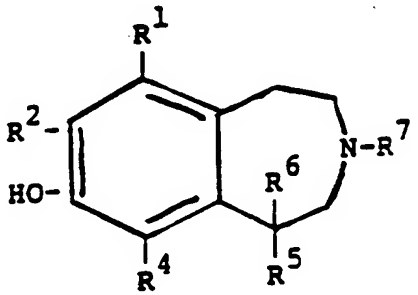
7. (+)-8-Chloro-7-(allylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine and (+)-8-chloro-7-[(N-methyl-N-ethoxycarbonyl)amino carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

8. A pharmaceutical composition comprising a compound according to any of claims 1 to 7 or a pharmaceutically acceptable salt thereof together with a pharmaceutically acceptable carrier or diluent.

9. A pharmaceutical composition suitable for use in the treatment of a mental disorder comprising an amount of a compound of any of claims 1 to 7 which is effective for the alleviation of such disorder together with a pharmaceutically acceptable carrier or diluent.

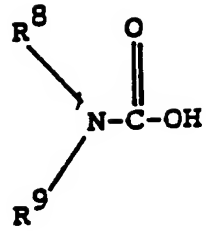
10. The use of a compound according to any of claims 1 to 7 or a pharmaceutically acceptable salt thereof for preparing a pharmaceutical composition for the treatment of mental disorders.

11. A process for preparing esters of general formula I or salts thereof according to claims 1 to 6, characterized by reacting a benzazepine compound of the general formula II



(II)

wherein R^1, R^2, R^4, R^5, R^6 and R^7 are defined as in general formula I with an activated carbamic acid of the general formula III



(III)

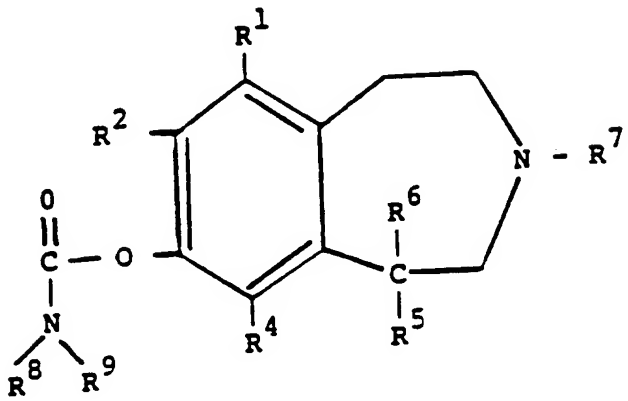
wherein R^8 and R^9 are defined as in general formula I or with one or two isocyanates, of general formula V

R^8-N = C = O and/or R^9-N = C = O (V)

wherein R^8 and R^9 are defined as in general formula I.

Claims for the following Contracting State : ES

1. A process for preparing esters of general formula I



(I)

wherein R^1 is H, halogen, or C_{1-4} alkyl

R^2 is halogen, CF_3, CN

R^4 is H, or halogen

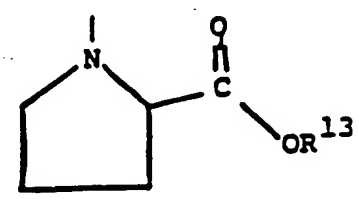
R^5 is furyl, thienyl, pyridyl, or ring systems consisting of phenyl ortho condensed with a benzene, cyclohexane, cyclohexene, cyclopentane or cyclopentene ring in which rings one of the carbon atoms may be exchanged with oxygen, sulphur or nitrogen, and each of these ring systems optionally are substituted with halogen, hydroxy or alkoxy with not more than 4 carbon atoms,

R^6 is H or CH_3

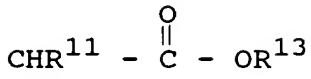
R^7 is H or C_{1-4} alkyl

R^8 is H or alkyl

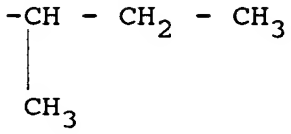
R^9 is H, or R^9 together with R^8 forms a piperidino, pyrrolidinyl, morpholino, or piperazinyl ring or



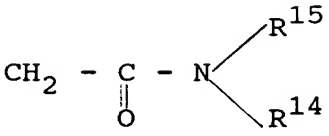
or R^9 can be alkyl or a group with the formula



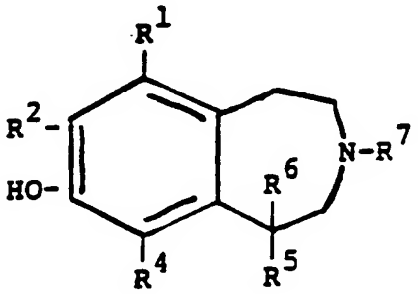
where R^{11} is H, CH_3, $(CH_3)_2CH$,



or - CH_2 - CH_2 - S - CH_3,
and R^{13} is H, alkyl or a 2-acetamide group with the formula

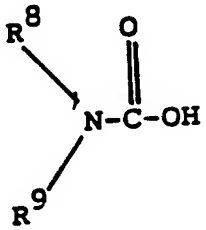


where R^{15} is H, CH_3, C_2H_5, C_3H_8, or $CH(CH_3)_2$, and
R^{14} is H, CH_3, C_2H_5, C_3H_8 or $CH(CH_3)_2$,
or pharmaceutical-acceptable salts thereof, characterized by reacting a benzazepine compound of the general formula II



(II)

wherein R^1, R^2, R^4, R^5, R^6 and R^7 are defined as in general formula I with an activated carbamic acid of the general formula III



(III)

wherein R^8 and R^9 are defined as in general formula I or with one or two isocyanates, of general formula V

R^8-N = C = O and/or R^9-N = C = O (V)

wherein R^8 and R^9 are defined as in general formula I.

2. The process according to claim 1 wherein the compound of formula I is (+)-8-chloro-7[(N,N-dimethylamino)carbonyloxy-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

3. The process according to claim 1 wherein the compound of formula I is (+)-8-chloro-7-[(R,S)-N-(1-methoxycarbonyl-1-ethyl)amino-carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

4. The process according to claim 1 wherein the compound of formula I is (+)-8-chloro-7-[(S)-N-(1-methoxycarbonyl-2-methyl-butyl)amino-carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

5. The process according to claim 1 wherein the compound of formula I is (+)-8-chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

6. The process according to claim 1 wherein the compound of formula I is (+)-8-chloro-7-[(N,N-dimethylamino)carbonyloxy]-5-(2,3-di-dydrobenzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

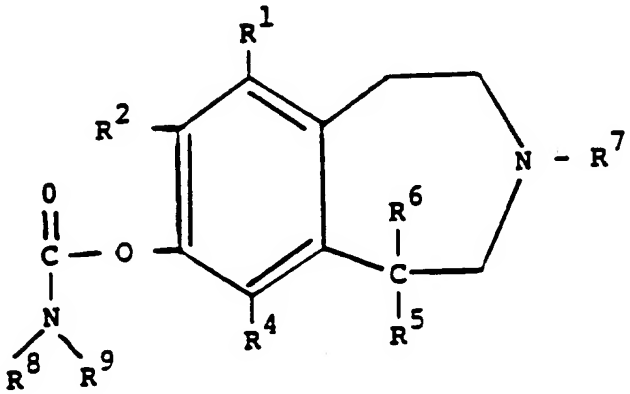
7. A process for preparing (+)-8-chloro-7-(allylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine and (+)-8-chloro-7-[(N-methyl-N-ethoxycarbonyl)amino-carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzaze pine, HCl as set forth in Examples 7 and 3 of the description, respectively.

8. The use of a compound prepared according to the process of any of claims 1 to 7 or a pharmaceutically acceptable salt thereof for preparing a medicament for the treatment of mental disorders.

9. A process for preparing a pharmaceutical composition comprising mixing a compound prepared according to any of claims 1 to 7 or a pharmaceutically acceptable salt thereof with a pharmaceutically acceptable carrier and/or diluent.

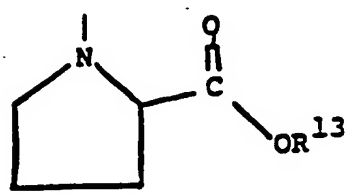
Claims for the following Contracting State : GR

1. Carbamic acid esters of substituted 7-hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepines with the general formula I

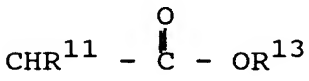


(I)

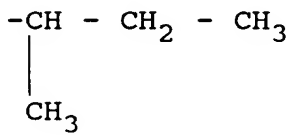
wherein R^1 is H, halogen, or C_{1-4} alkyl
R^2 is halogen, CF_3, CN
R^4 is H, or halogen
R^5 is furyl, thienyl, pyridyl, or ring systems consisting of phenyl ortho condensed with a benzene, cyclohexane, cyclohexene, cyclopentane or cyclopentene ring in which rings one of the carbon atoms may be exchanged with oxygen, sulphur or nitrogen, and each of these ring systems optionally are substituted with halogen, hydroxy or alkoxy with not more than 4 carbon atoms,
R^6 is H or CH_3
R^7 is H or C_{1-4} alkyl
R^8 is H or alkyl
R^9 is H, or R^9 together with R^8 forms a piperidino, pyrrolidinyl, morpholino, or piperazinyl ring or



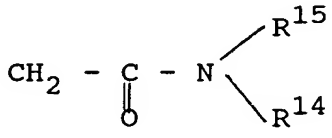
or R^9 can be alkyl or a group with the formula



where R^{11} is H, CH_3, $(CH_3)_2CH$,



or $-CH_2-CH_2-S-CH_3$,
and R^{13} is H, alkyl or a 2-acetamide group with the formula



where R^{15} is H, CH_3, C_2H_5, C_3H_8, or $CH(CH_3)_2$, and
R^{14} is H, CH_3, C_2H_5, C_3H_8 or $CH(CH_3)_2$,
and pharmaceutical-acceptable salts thereof.

2. A compound according to claim 1, which is (+)-8-chloro-7[(N,N-dimethylamino)carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

3. A compound according to claim 1, which is (+)-8-chloro-7-[(R,S)-N-(1-methoxycarbonyl-1-ethyl)amino carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

4. A compound according to claim 1, which is (+)-8-chloro-7-[(S)-N-(1-methoxycarbonyl-2-methyl-butyl)-aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

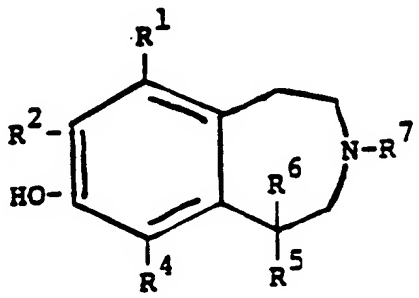
5. A compound according to claim 1, which is (+)-8-chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine.

6. A compound according to claim 1, which is (+)-8-chloro-7-[(N,N-dimethylamino)carbonyloxy]-5-(2,3-dihydrobenzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

7. (+)-8-Chloro-7-(allylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine and (+)-8-chloro-7-[(N-methyl-N-ethoxycarbonyl)amino carbonyloxy]-5(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepine, HCl.

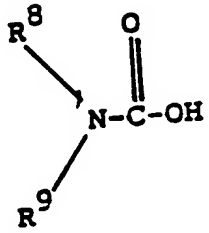
8. The use of a compound according to any of claims 1 to 7 or a pharmaceutically acceptable salt thereof for preparing a medicament for the treatment of mental disorders.

9. A process for preparing esters of general formula I according to claims 1 to 6 or salts thereof, characterized by reacting a benzazepine compound of the general formula II



(II)

wherein R^1, R^2, R^4, R^5, R^6 and R^7 are defined as in general formula I with an activated carbamic acid of the general formula III



(III)

wherein R^8 and R^9 are defined as in general formula I or with one or two isocyanates, of general formula V

R^8-N = C = O and/or R^9-N = C = O (V)

wherein R^8 and R^9 are defined as in general formula I.

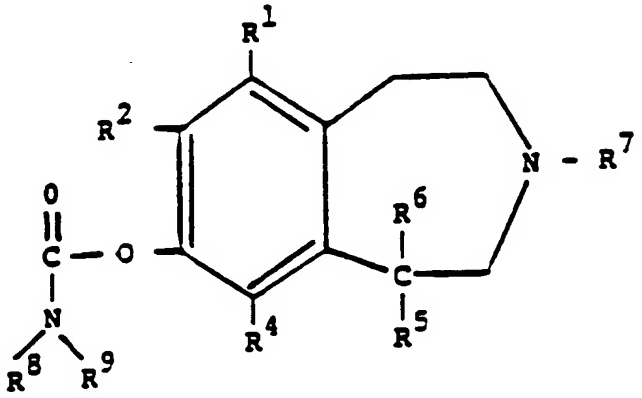
10. A process for preparing the compounds according to claim 7 as set forth in Examples 7 and 3 of the description, respectively.

11. A process for preparing a pharmaceutical composition comprising mixing a compound according to any of claims 1 to 7 and/or a pharmaceutically acceptable salt thereof with pharmaceutically acceptable carrier and/or diluent.

Patentansprüche

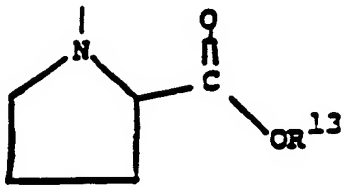
Patentansprüche für folgende Vertragsstaaten : AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE

1. Carbaminsäureester von substituierten 7-Hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepinen der allgemeinen Formel I

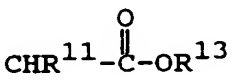


(I)

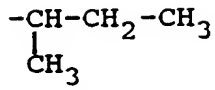
worin
R^1 H, Halogen oder C_{1-4}-Alkyl ist,
R^2 Halogen, CF_3 oder CN ist,
R^4 H oder Halogen ist,
R^5 Furyl, Thienyl, Pyridyl oder Ringsysteme darstellt, bestehend aus mit einem Benzol-, Cyclohexan-, Cyclohexen-, Cyclopentan- oder Cyclopentenring ortho-kondensierten Phenyl, wobei in den Ringen eines der Kohlenstoffatome durch Sauerstoff, Schwefel oder Stickstoff ausgetauscht sein kann und jedes dieser Ringsysteme gegebenenfalls mit Halogen, Hydroxy oder Alkoxy mit nicht mehr als 4 Kohlenstoffatomen substituiert ist,
R^6 H oder CH_3 ist,
R^7 H oder C_{1-4}-Alkyl ist,
R^8 H oder Alkyl ist,
R^9 H ist oder zusammen mit R^8 einen Piperidino-, Pyrrolidinyl-, Morpholino- oder Piperazinylring bildet, oder



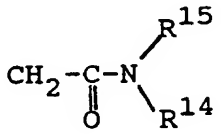
ist, oder R^9 kann Alkyl oder eine Gruppe der Formel



sein, worin R^{11} H, CH_3, $(CH_3)_2CH$,



oder $-CH_2-CH_2-S-CH_3$
ist, und R^{13} H, Alkyl oder eine 2-Acetamidgruppe der Formel



ist, worin R^{15} H, CH_3, C_2H_5, C_3H_8 oder $CH(CH_3)_2$ ist und
R^{14} H, CH_3, C_2H_5, C_3H_8 oder $CH(CH_3)_2$ ist,
und pharmazeutisch annehmbare Salze davon.

2. Verbindung nach Anspruch 1, die (+)-8-Chloro-7[N,N-dimethylamino)carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

3. Verbindung nach Anspruch 1, die (+)-8-Chloro-7[R,S)-N-(1-methoxycarbonyl-1-ethyl)-aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

4. Verbindung nach Anspruch 1, die (+)-8-Chloro-7[(S)-N-(1-methoxycarbonyl-2-methyl-butyl)-aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

5. Verbindung nach Anspruch 1, die (+)-8-Chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

6. Verbindung nach Anspruch 1, die (+)-8-Chloro-7[N,N-dimethylamino)carbonyloxy]-5-(2,3-dihydrobenzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin, HCl ist.

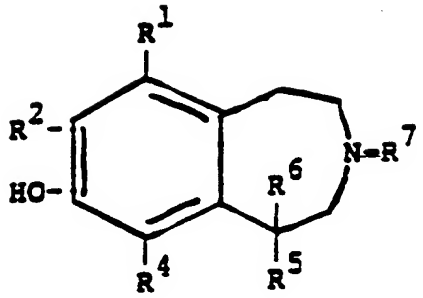
7. (+)-8-Chloro-7-(allylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin und (+)-8-Chloro-7-[(N-methyl-N-ethoxycarbonyl)aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin, HCl.

8. Pharmazeutische Zusammensetzung, umfassend eine Verbindung nach einem der Ansprüche 1 bis 7 oder ein pharmazeutisch annehmbares Salz davon zusammen mit einem pharmazeutisch annehmbaren Träger oder Verdünnungsmittel.

9. Pharmazeutische Zusammensetzung, geeignet zur Verwendung bei der Behandlung einer geistigen Störung, umfassend eine Menge einer Verbindung nach einem der Ansprüche 1 bis 7, die wirksam ist, solch eine Störung zu lindern, zusammen mit einem pharmazeutisch annehmbaren Träger oder Verdünnungsmittel.

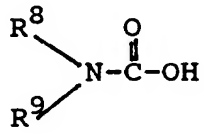
10. Verwendung einer Verbindung nach einem der Ansprüche 1 bis 7 oder eines pharmazeutisch annehmbaren Salzes davon zur Herstellung einer pharmazeutischen Zusammensetzung für die Behandlung von geistigen Störungen.

11. Verfahren zum Herstellen von Estern der allgemeinen Formel I oder von Salzen davon gemäß den Ansprüchen 1 bis 6, **gekennzeichnet durch** Reagierenlassen einer Benzazepinverbindung der allgemeinen Formel II



(II)

worin R^1, R^2, R^4, R^5, R^6 und R^7 wie in der allgemeinen Formel I definiert sind, mit einer aktivierten Carbaminsäure der allgemeinen Formel III



(III)

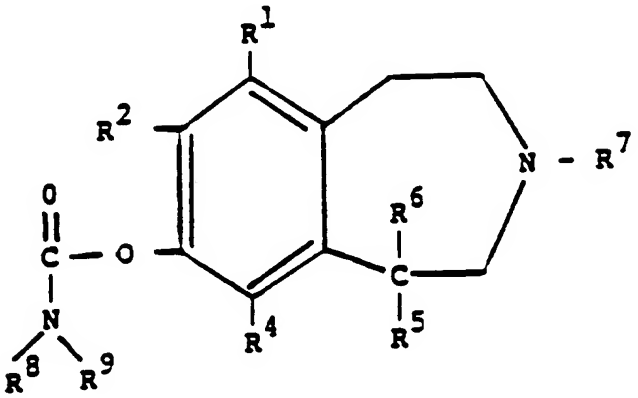
worin R^8 und R^9 wie in der allgemeinen Formel I definiert sind, oder mit einem oder zwei Isocyanaten der allgemeinen Formel V

R^8-N = C = O und/oder R^9-N = C = O (V)

worin R^8 und R^9 wie in der allgemeinen Formel I definiert sind.

Patentansprüche für folgenden Vertragsstaat : ES

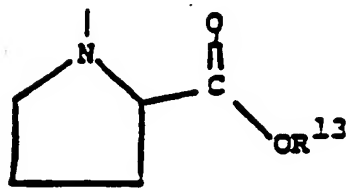
1. Verfahren zum Herstellen von Estern der allgemeinen Formel I



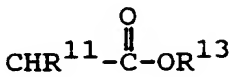
(I)

worin
R^1 H, Halogen oder C_{1-4}-Alkyl ist,
R^2 Halogen, CF_3 oder CN ist,
R^4 H oder Halogen ist,
R^5 Furyl, Thienyl, Pyridyl oder Ringsysteme darstellt, bestehend aus mit einem Benzol-, Cyclohexan-, Cyclohexen-, Cyclopentan- oder Cyclopentenring ortho-kondensierten Phenyl, wobei in den Ringen eines der Kohlenstoffatome durch Sauerstoff, Schwefel oder Stickstoff ausgetauscht sein kann und jedes dieser Ringsysteme gegebenenfalls mit Halogen, Hydroxy oder Alkoxy mit nicht mehr als 4 Kohlenstoffatomen substituiert ist,

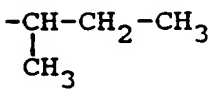
R^6 H oder CH_3 ist,
R^7 H oder C_{1-4}-Alkyl ist,
R^8 H oder Alkyl ist,
R^9 H ist oder zusammen mit R^8 einen Piperidino-, Pyrrolidinyl-, Morpholino- oder Piperazinylring bildet, oder



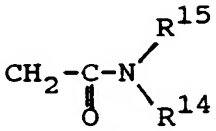
ist, oder R^9 kann Alkyl oder eine Gruppe der Formel



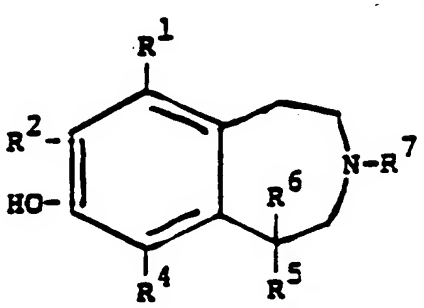
sein, worin R^{11} H, CH_3, $(CH_3)_2CH$,



oder $-CH_2-CH_2-S-CH_3$
ist, und R^{13} H, Alkyl oder eine 2-Acetamidgruppe der Formel

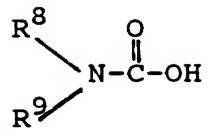


ist, worin R^{15} H, CH_3, C_2H_5, C_3H_8 oder $CH(CH_3)_2$ ist und
R^{14} H, CH_3, C_2H_5, C_3H_8 oder $CH(CH_3)_2$ ist,
oder eines pharmazeutisch annehmbaren Salzes davon, **gekennzeichnet durch** Reagierenlassen einer Benzazepinverbindung der allgemeinen Formel II



(II)

worin R^1, R^2, R^4, R^5, R^6 und R^7 wie in der allgemeinen Formel I definiert sind, mit einer aktivierten Carbaminsäure der allgemeinen Formel III



(III)

worin R^8 und R^9 wie in der allgemeinen Formel I definiert sind, oder mit einem oder zwei Isocyanaten der allgemeinen Formel V

R^8-N = C = O und/oder R^9-N = C = O (V)

worin R^8 und R^9 wie in der allgemeinen Formel I definiert sind.

2. Verfahren nach Anspruch 1, worin die Verbindung der Formel I (+)-8-Chloro-7[N,N-dimethylamino)-carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

3. Verbindung nach Anspruch 1, worin die Verbindung der Formel I (+)-8-Chloro-7[R,S)-N-(1-methoxycarbonyl-1-ethyl)aminocarbonyloxy]-5-(7-benzo-furanyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

4. Verbindung nach Anspruch 1, worin die Verbindung der Formel I (+)-8-Chloro-7[(S)-N-(1-methoxycarbonyl-2-methylbutyl)aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

5. Verbindung nach Anspruch 1, worin die Verbindung der Formel I (+)-8-Chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H- 3-methyl-3-benzazepin ist.

6. Verbindung nach Anspruch 1, worin die Verbindung der Formel I (+)-8-Chloro-7[N,N-dimethylamino)-carbonyloxy]-5-(2,3 dihydrobenzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3 benzazepin, HCl ist.

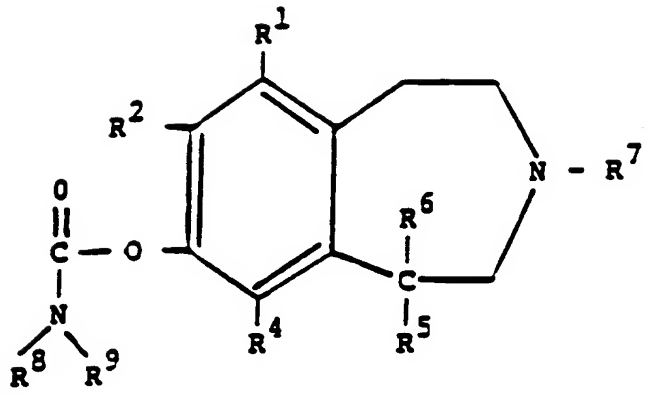
7. Verfahren zum Herstellen von (+)-8-Chloro-7-(allylamino carbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin und (+)-8-Chloro- 7-[(N-methyl-N-ethoxycarbonyl)-aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin, HCl, wie in den Beispielen 7 und 3 der Beschreibung beschrieben.

8. Verwendung einer Verbindung, hergestellt nach dem Verfahren nach einem der Ansprüche 1 bis 7, oder eines pharmazeutisch annehmbaren Salzes davon zum Herstellen eines Medikaments zur Behandlung von geistigen Störungen.

9. Verfahren zum Herstellen einer pharmazeutischen Zusammensetzung, welches das Mischen einer Verbindung, hergestellt nach einem der Ansprüche 1 bis 7, oder eines pharmazeutisch annehmbaren Salzes davon mit einem pharmazeutisch annehmbaren Träger und/oder Verdünnungsmittel umfaßt.

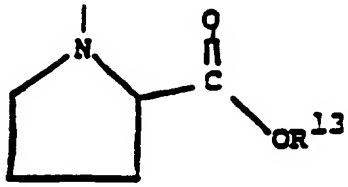
Patentansprüche für folgenden Vertragsstaat : GR

1. Carbaminsäureester von substituierten 7-Hydroxy-2,3,4,5-tetrahydro-1H-3-benzazepinen der allgemeinen Formel I

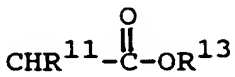


(I)

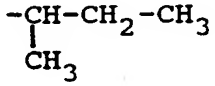
worin
R^1 H, Halogen oder C_{1-4}-Alkyl ist,
R^2 Halogen, CF_3 oder CN ist,
R^4 H oder Halogen ist,
R^5 Furyl, Thienyl, Pyridyl oder Ringsysteme darstellt, bestehend aus mit einem Benzol-, Cyclohexan-, Cyclohexen-, Cyclopentan- oder Cyclopentenring ortho-kondensierten Phenyl, wobei in den Ringen eines der Kohlenstoffatome durch Sauerstoff, Schwefel oder Stickstoff ausgetauscht sein kann und jedes dieser Ringsysteme gegebenenfalls mit Halogen, Hydroxy oder Alkoxy mit nicht mehr als 4 Kohlenstoffatomen substituiert ist,
R^6 H oder CH_3 ist,
R^7 H oder C_{1-4}-Alkyl ist,
R^8 H oder Alkyl ist,
R^9 H ist oder zusammen mit R^8 einen Piperidino-, Pyrrolidinyl-, Morpholino- oder Piperazinylring bildet, oder



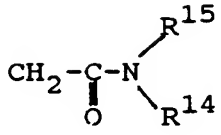
ist, oder R^9 kann Alkyl oder eine Gruppe der Formel



sein, worin R^{11} H, CH_3, $(CH_3)_2CH$,



oder $-CH_2-CH_2-S-CH_3$
ist, und R^{13} H, Alkyl oder eine 2-Acetamidgruppe der Formel



ist, worin R^{15} H, CH_3, C_2H_5, C_3H_8 oder $CH(CH_3)_2$ ist und
R^{14} H, CH_3, C_2H_5, C_3H_8 oder $CH(CH_3)_2$ ist,
und pharmazeutisch annehmbare Salze davon.

2. Verbindung nach Anspruch 1, die (+)-8-Chloro-7[N,N-dimethylamino)carbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

3. Verbindung nach Anspruch 1, die (+)-8-Chloro-7[R,S)-N-(1-methoxycarbonyl-1-ethyl)-aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

4. Verbindung nach Anspruch 1, die (+)-8-Chloro-7[(S)-N-(1-methoxycarbonyl-2-methyl-butyl)-aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

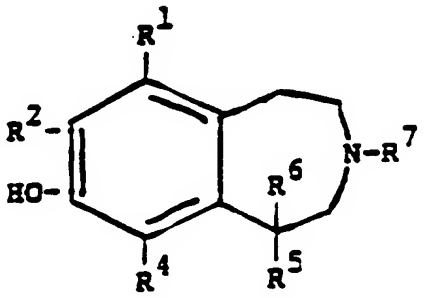
5. Verbindung nach Anspruch 1, die (+)-8-Chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin ist.

6. Verbindung nach Anspruch 1, die (+)-8-Chloro-7[N,N-dimethylamino)carbonyloxy]-5-(2,3-dihydrobenzofuran-7-yl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin, HCl ist.

7. (+)-8-Chloro-7-(allylaminocarbonyloxy)-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin und (+)-8-Chloro-7-[(N-methyl-N-ethoxycarbonyl)aminocarbonyloxy]-5-(7-benzofuranyl)-2,3,4,5-tetrahydro-1H-3-methyl-3-benzazepin, HCl.

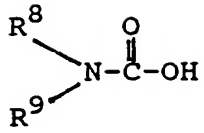
8. Verwendung einer Verbindung nach einem der Ansprüche 1 bis 7 oder eines pharmazeutisch annehmbaren Salzes davon zum Herstellen eines Medikaments für die Behandlung geistiger Störungen.

9. Verfahren zur Herstellung von Estern der allgemeinen Formel I gemäß den Ansprüchen 1 bis 6 oder von Salzen davon, **gekennzeichnet durch** Reagierenlassen einer Benzazepinverbindung der allgemeinen Formel II



(II)

worin R^1, R^2, R^4, R^5, R^6 und R^7 wie in der allgemeinen Formel I definiert sind, mit einer aktivierten Carbaminsäure der allgemeinen Formel III



(III)

worin R^8 und R^9 wie in der allgemeinen Formel I definiert sind, oder mit einem oder zwei Isocyanaten der allgemeinen Formel V

R^8-N = C = O und/oder R^9-N = C = O (V)

worin R^8 und R^9 wie in der allgemeinen Formel I definiert sind.

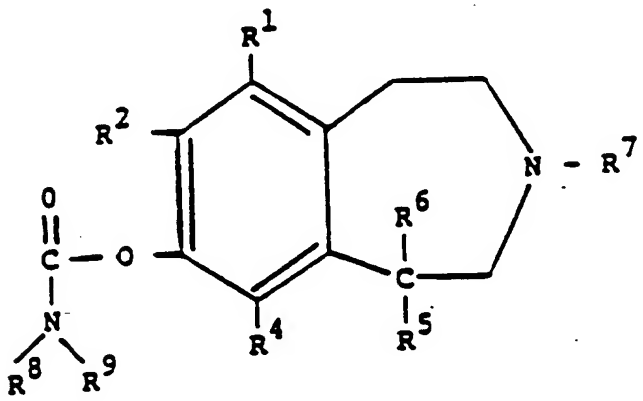
10. Verfahren zum Herstellen der Verbindungen nach Anspruch 7, wie in den Beispielen 7 und 3 der Beschreibung beschrieben.

11. Verfahren zum Herstellen einer pharmazeutischen Zusammensetzung, welches das Mischen einer Verbindung nach einem der Ansprüche 1 bis 7 und/oder eines pharmazeutisch annehmbaren Salzes davon mit einem pharmazeutisch annehmbaren Träger und/oder Verdünnungsmittel umfaßt.

Revendications

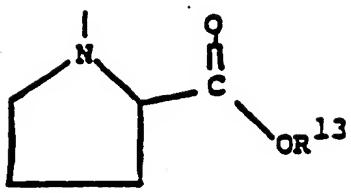
Revendications pour les Etats contractants suivants : AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE

1. Esters d'acide carbamique dérivés de 7-hydroxy-2,3,4,5-tétrahydro-1H-3-benzazépines substituées, de formule générale I :

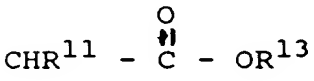


(I)

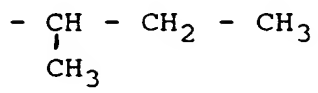
dans laquelle R^1 représente H, un atome d'halogène ou un groupe alkyle en C_1-C_4,
R^2 représente un atome d'halogène, un groupe CF_3, CN
R^4 représente un H ou un atome d'halogène,
R^5 représente un groupe furyle, thiényle, pyridyle, ou des systèmes cycliques consistant en un groupe phényle condensé en ortho avec un cycle benzène, cyclohexane, cyclohexène, cyclopentane ou cyclopentène, l'un des atomes de carbone de ces cycles pouvant être remplacé par un atome d'oxygène, de soufre ou d'azote, et chacun de ces systèmes cycliques, étant éventuellement substitué avec un atome d'halogène, un groupe hydroxy ou un groupe alkoxy sur pas plus de 4 atomes de carbone,
R^6 représente H ou CH_3
R^7 représente H ou un groupe alkyle en C_1-C_4
R^8 représente H ou un groupe alkyle
R^9 représente H, ou R^9 forme ensemble avec R^8 un groupe pipéridino, pyrrolidinyle, morpholino, ou un cycle pipérazinyle ou un groupe :



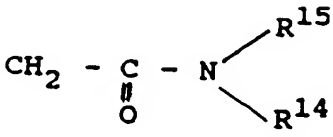
ou R^9 peut représenter un groupe alkyle ou un groupe de formule :



dans laquelle R^{11} représente H, CH_3, $(CH_3)_2CH$,



ou $-CH_2-CH_2-S-CH_3$,
et R^{13} représente H, un groupe alkyle ou 2-acétamide de formule :



dans laquelle R^{15} représente H, CH_3, C_2H_5, C_3H_8 ou $CH(CH_3)_2$, et
R^{14} représente H, CH_3, C_2H_5, C_3H_8 ou $CH(CH_3)_2$,
et les sels pharmaceutiquement acceptables de ceux-ci.

2. Composé selon la revendication 1, qui est la (+)-8-chloro-7[(N,N-diméthylamino-carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

3. Composé selon la revendication 1, qui est la (+)-8-chloro-7-[(R,S)-N-(1-méthoxycarbonyl-1-éthyl)amino-carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

4. Composé selon la revendication 1, qui est la (+)-8-chloro-7-[(S)-N-(1-méthoxycarbonyl-2-méthylbutyl)-amino-carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

5. Composé selon la revendication 1, qui est la (+)-8-chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

6. Composé selon la revendication 1, qui est le chlorhydrate de la (+)-8-chloro-7-[(N,N-diméthylamino)-carbonyloxy]-5-(2,3-dihydrobenzofurann-7-yl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

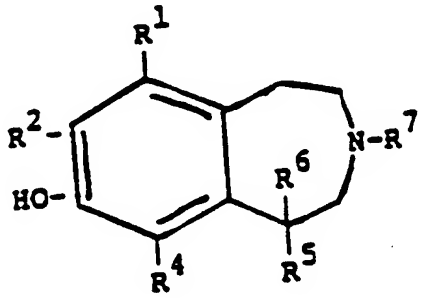
7. (+)-8-chloro-7-(allylaminocarbonyloxy)-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine et chlorhydrate de (+)-8-chloro-7-[(N-méthyl-N-éthoxycarbonyl)amino carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

8. Composition pharmaceutique, comprenant un composé selon l'une quelconque des revendications 1 à 7, ou un sel pharmaceutiquement acceptable de celui-ci, en association avec un véhicule ou un diluant pharmaceutiquement acceptable.

9. Composition pharmaceutique appropriée pour être employée pour le traitement d'un trouble mental, comprenant une quantité d'un composé selon l'une quelconque des revendications 1 à 7, efficace pour soulager un tel trouble, en association avec un véhicule ou un diluant pharmaceutiquement acceptable.

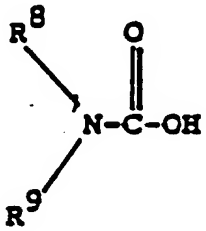
10. Utilisation d'un composé selon l'une quelconque des revendications 1 à 7, ou d'un sel pharmaceutiquement acceptable de celui-ci, pour préparer une composition pharmaceutique pour le traitement de troubles mentaux.

11. Procédé de préparation d'esters de formule générale I, ou de sels de ceux-ci selon l'une quelconque des revendications 1 à 6, caractérisé en ce qu'on fait réagir un composé dérivé de benzazépine de formule générale II :



(II)

dans laquelle R^1, R^2, R^4, R^5, R^6 et R^7 sont définis dans la formule générale I, avec un acide carbamique activé de formule générale III :



(III)

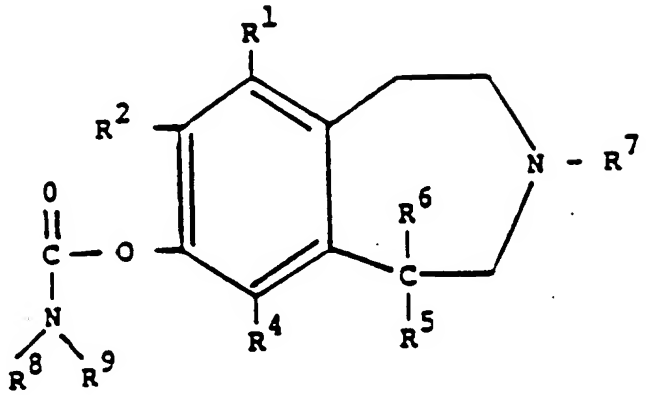
dans laquelle R^8 et R^9 sont tels que définis dans la formule générale I, ou avec un ou deux isocyanates de formule générale V :

$R^8\text{-}N=C=O$ et/ou $R^9\text{-}N=C=O$ (V)

dans lesquelles R^8 et R^9 sont tels que définis dans la formule générale I.

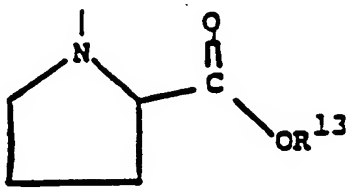
Revendications pour l'Etat contractant suivant : ES

1. Procédé de préparation d'esters de formule générale I :

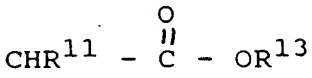


(I)

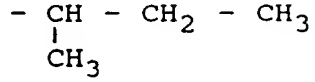
dans laquelle R^1 représente H, un atome d'halogène ou un groupe alkyle en C_1-C_4,
R^2 représente un atome d'halogène, un groupe CF_3 ou CN
R^4 représente un H ou un atome d'halogène,
R^5 représente un groupe furyle, thiényle, pyridyle, ou des systèmes cycliques consistant en un groupe phényle condensé en ortho avec un cycle benzène, cyclohexane, cyclohexène, cyclopentane ou cyclopentène, l'un des atomes de carbone de ces cycles, pouvant être remplacé par un atome d'oxygène, de soufre ou d'azote, et chacun de ces systèmes cycliques étant éventuellement substitué avec un atome d'halogène, un groupe hydroxy ou alkoxy sur pas plus de 4 atomes de carbone,
R^6 représente H ou CH_3
R^7 représente H ou un groupe alkyle en C_1-C_4
R^8 représente H ou un groupe alkyle
R^9 représente H, ou R^9 forme ensemble avec R^8 un cycle pipéridino, pyrrolidinyle, morpholino ou pipérazinyle, ou un groupe de formule :



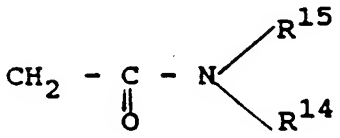
ou R^9 peut représenter un groupe alkyle ou un groupe de formule :



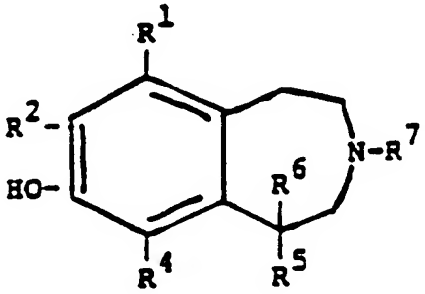
dans laquelle R^{11} représente H, CH_3, $(CH_3)_2CH$,



ou - CH_2 - CH_2 - S - CH_3,
et R^{13} représente H, un groupe alkyle ou 2-acétamide de formule :

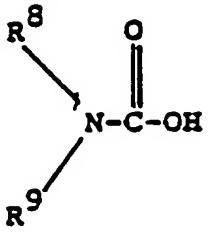


dans laquelle R^{15} représente H, CH_3, C_2H_5, C_3H_8 ou $CH(CH_3)_2$, et
R^{14} représente H, CH_3, C_2H_5, C_3H_8 ou $CH(CH_3)_2$,
ou de sels pharmaceutiquement acceptables de ceux-ci, caractérisé en ce qu'on fait réagir un composé dérivé de benzazépine de formule générale II :



(II)

dans laquelle R^1, R^2, R^4, R^5, R^6 et R^7 sont tels que définis dans la formule générale I, avec un acide carbamique activé de formule générale III :



(III)

dans laquelle R^8 et R^9 sont tels que définis dans la formule générale I, ou avec un ou deux isocyanates de formule générale V :

R^8-N = C = O et/ou R^9-N = C = O (V)

dans lesquelles R^8 et R^9 sont tels que définis dans la formule générale I.

2. Procédé selon la revendication 1 dans lequel le composé de formule I, est la (+)-8-chloro-7[(N,N-diméthylamino-carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

3. Procédé selon la revendication 1, dans lequel le composé de formule I, est la (+)-8-chloro-7-[(R,S)-N-(1-méthoxycarbonyl-1-éthyl)aminocarbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

4. Procédé selon la revendication 1, dans lequel le composé de formule I est la (+)-8-chloro-7-[(S)-N-(1-méthoxycarbonyl-2-méthyl-butyl)amino-carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-

méthyl-3-benzazépine.

5. Procédé selon la revendication 1, dans lequel le composé de formule I, est la (+)-8-chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

6. Procédé selon la revendication 1, dans lequel le composé de formule I, est le chlorhydrate de (+)-8-chloro-7-[(N,N-diméthylamino)carbonyloxy]-5-(2,3-dihydrobenzofurann-7-yl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

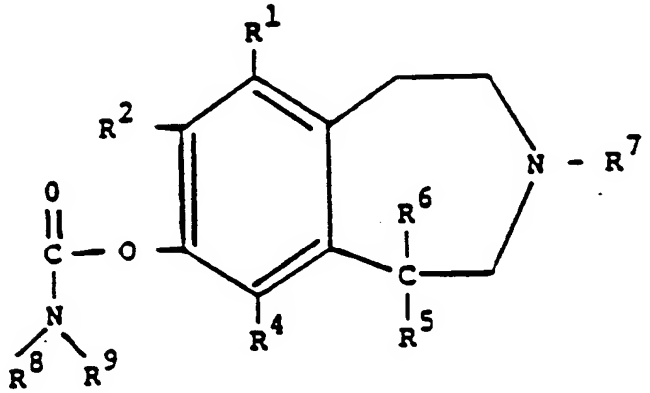
7. Procédé de préparation de la (+)-8-chloro-7-(allylaminocarbonyloxy)-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine et du chlorhydrate de (+)-8-chloro-7-[(N-méthyl-N-éthoxycarbonyl)amino carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine, ainsi que cela est respectivement mentionné dans les exemples 2 et 3 de la description.

8. Utilisation d'un composé préparé selon le procédé de l'une quelconque des revendications 1 à 7, ou d'un sel pharmaceutiquement acceptable de celui-ci, pour préparer un médicament destiné au traitement de troubles mentaux.

9. Procédé de préparation d'une composition pharmaceutique, selon lequel on mélange un composé préparé selon l'une quelconque des revendications 1 à 7, ou d'un sel pharmaceutiquement acceptable de celui-ci, avec un véhicule et/ou un diluant pharmaceutiquement acceptables.

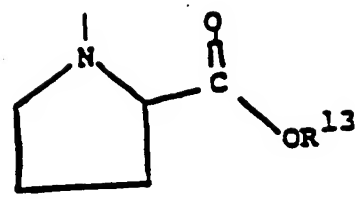
Revendications pour l'Etat contractant suivant : GR

1. Esters d'acide carbamique dérivés de 7-hydroxy-2,3,4,5-tétrahydro-1H-3-benzazépines substituées, de formule générale I :

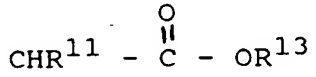


(I)

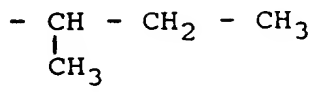
dans laquelle R^1 représente H, un atome d'halogène ou un groupe alKyle en C_1-C_4,
R^2 représente un atome d'halogène, un groupe CF_3 ou CN
R^4 représente un H ou un atome d'halogène,
R^5 représente un groupe furyle, thiényle, pyridyle, ou des systèmes cycliques consistant en un groupe phényle condensé en ortho avec un cycle benzène, cyclohexane, cyclohexène, cyclopentane ou cyclopentène, l'un des atomes de carbone de ces cycles, pouvant être remplacé par un atome d'oxygène, de soufre ou d'azote, et chacun de ces systèmes cycliques étant éventuellement substitué avec un atome d'halogène, un groupe hydroxy ou un alkoxy, sur pas plus de 4 atomes de carbone,
R^6 représente H ou CH_3
R^7 représente H ou un groupe alkyle en C_1-C_4
R^8 représente H ou un groupe alkyle
R^9 représente H, ou R^9 forme ensemble avec R^8 un cycle pipéridino, pyrrolidinyle, morpholino ou un pipérazinyle, ou un groupe :



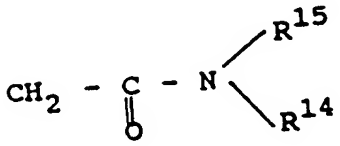
ou R^9 peut représenter un groupe alkyle ou un groupe de formule :



dans laquelle R^{11} représente H, CH_3, $(CH_3)_2CH$,



ou $-CH_2-CH_2-S-CH_3$,
et R^{13} représente H, un groupe alkyle ou 2-acétamide de formule :



dans laquelle R^{15} représente H, CH_3, C_2H_5, C_3H_8 ou $CH(CH_3)_2$, et
R^{14} représente H, CH_3, C_2H_5, C_3H_8 ou $CH(CH_3)_2$,
et les sels pharmaceutiquement acceptables de ceux-ci.

2. Composé selon la revendication 1, qui est la (+)-8-chloro-7[(N,N-diméthylamino-carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

3. Composé selon la revendication 1, qui est la (+)-8-chloro-7-[(R,S)-N-(1-méthoxycarbonyl-1-éthyl)amino-carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

4. Composé selon la revendication 1, qui est la (+)-8-chloro-7-[(S)-N-(1-méthoxycarbonyl-2-méthylbutyl)-amino-carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

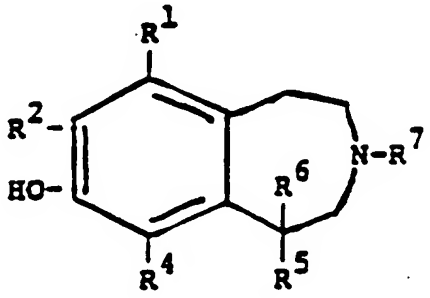
5. Composé selon la revendication 1, qui est la (+)-8-chloro-7-(isopropylaminocarbonyloxy)-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

6. Composé selon la revendication 1, qui est le chlorhydrate de (+)-8-chloro-7-[(N,N-diméthylamino)-carbonyloxy]-5-(2,3-dihydrobenzofurann-7-yl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

7. (+)-8-chloro-7-(allylaminocarbonyloxy)-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine et chlorhydrate de (+)-8-chloro-7-[(N-méthyl-N-éthoxycarbonyl)amino carbonyloxy]-5-(7-benzofurannyl)-2,3,4,5-tétrahydro-1H-3-méthyl-3-benzazépine.

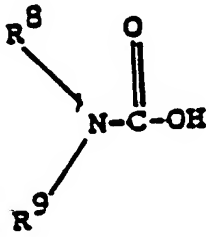
8. Utilisation d'un composé selon l'une quelconque des revendications 1 à 7, ou d'un sel pharmaceutiquement acceptable de celui-ci, pour préparer un médicament destiné au traitement de troubles mentaux.

9. Procédé de préparation d'esters de formule générale I selon les revendications 1 à 6 ou de sels de ceux-ci, caractérisé en ce qu'on fait réagir un composé dérivé de benzazépine de formule générale II :



(II)

dans laquelle R^1, R^2, R^4, R^5, R^6 et R^7 sont tels que définis dans la formule générale I, avec un acide carbamique activé de formule générale III :



(III)

dans laquelle R^8 et R^9 sont tels que définis dans la formule générale I, ou avec un ou deux isocyanates de formule générale V :

R^8-N = C = O et/ou R^9-N = C = O (V)

dans lesquelles R^8 et R^9 sont tels que définis dans la formule générale I.

10. Procédé de préparation des composés selon la revendication 7, ainsi que cela est respectivement mentionné dans les exemples 2 et 3 de la description.

11. Procédé de préparation d'une composition pharmaceutique, selon lequel on mélange le composé de l'une quelconque des revendications 1 à 7 et/ou un sel pharmaceutiquement acceptable de celui-ci, avec un véhicule et/ou un diluant pharmaceutiquement acceptables.